Balboa™ Series

SUB10

Powered Subwoofer

Service Manual

JBL Consumer Products
250 Crossways Park Dr.
Woodbury, New York 11797

Rev0 10/2006

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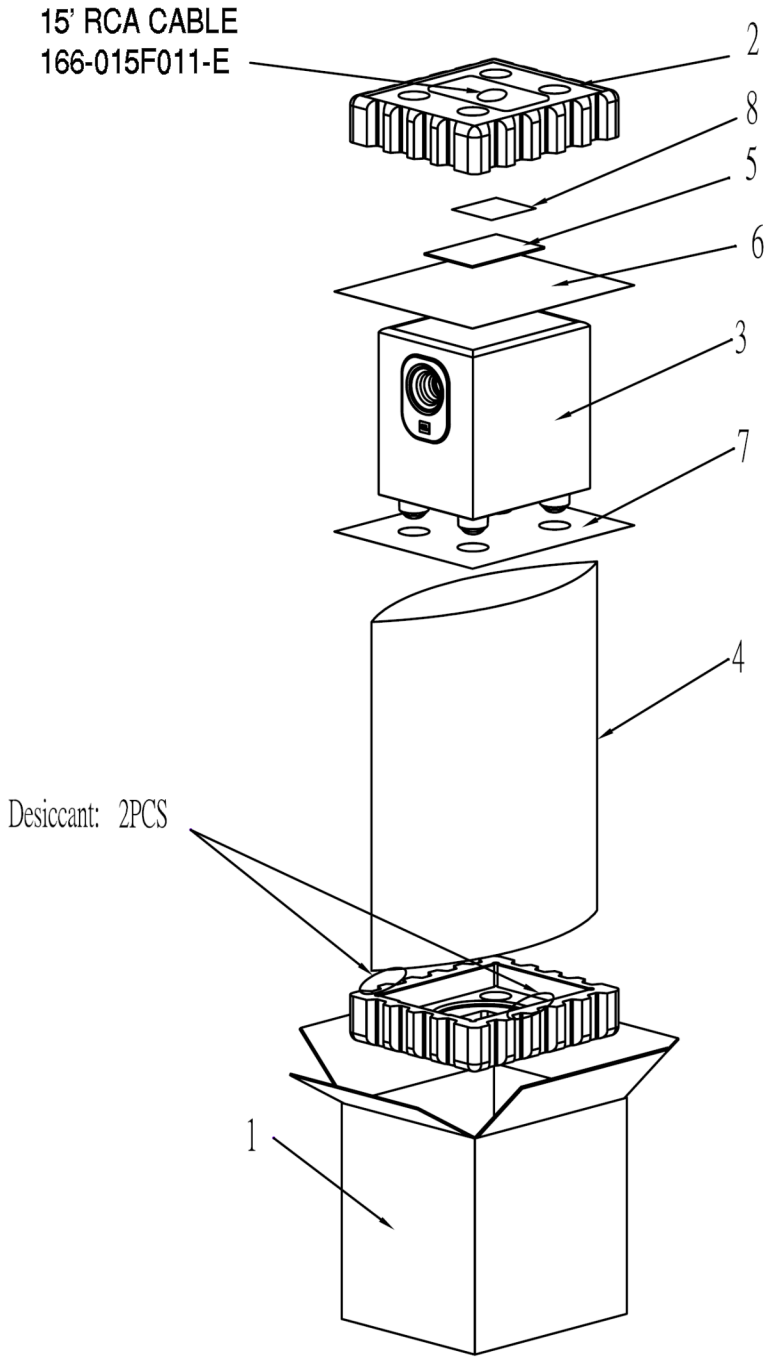
BALBOA SUB10 SPECIFICATIONS

Amplifier Power (RMS):	100 Watts
Peak Dynamic Power *:	225 Watts
Driver:	10" (254mm)
Inputs:	Line Level and LFE
Crossover Frequency:	Variable from 50Hz to 150Hz, 24 dB per octave
Frequency Response:	30Hz – 150Hz
Dimensions (H x W x D):	19-3/4" x 14-1/16" x 14-3/4" (502mm x 357mm x 375mm)
Weight:	35 lb/16kg

JBL continually strives to update and improve existing products, as well as create new ones. The specifications and details in this and related JBL publications are therefore subject to change without notice.

***** The Peak Dynamic Power is measured by recording the highest center-to-peak voltage measured across the output of a resistive load equal to minimum impedance of the transducer, using a 50Hz sine wave burst, 3 cycles on, 17 cycles off.



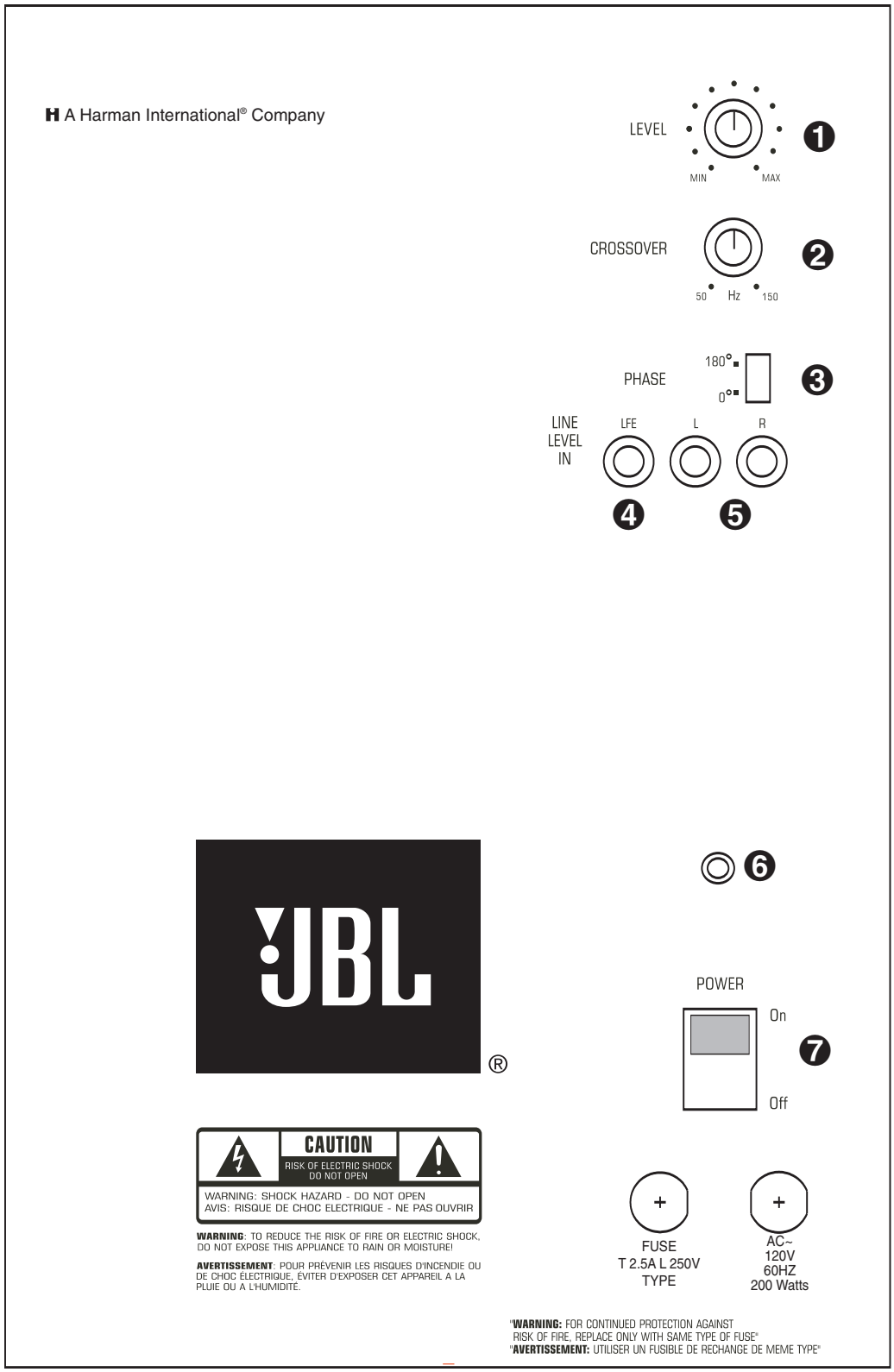
Item #	Part Number	Description	Qty
1	400-000-07155-E	Outer Carton (120v)	1
	400-000-07436-E	Outer Carton (230v)	1
2	431-000-05876-E	Polyfoam Set	1
3	BALBOASUB10	BALBOA SUB10 (120v)	1
4		Plastic Bag	1
5	406-000-05480-E	Owner's Manual (120v)	1
	406-000-05555-E	Owner's Manual (230v)	1
6		Protective Sheet	1
7		Protective Sheet	1
8	405-000-05122-E	Warranty Card	1

Balboa Sub 10	**100W Powered Sub/ Plate Amp**				
LINE VOLTAGE	**Yes/No**	**Hi/Lo Line**	**Unit**	**Notes**	
US 120VAC/60Hz	Yes	108-132	Vrms	Normal Operation	
EU 230VAC/50-60Hz	Yes	207-254	Vrms	Normal Operation	Normal operation, MOMS required
Parameter	**Specification**	**Unit**	**QA Test Limits**	**Conditions**	**Notes**
Amp Section					
Type (120V Model)	AB	AB	N/A		120V System is Class AB
Type (230V Model)	G	H	N/A		230V System is Class G
Load Impedance (speaker)	4	Ohms	N/A	Nominal	
System average impedance	8.2	Ohms	Reference	Measured with AP using the ratio method, sweeping with an ext. amp 10 to 500 Hz	Average on the operating BW from 10 to 500Hz
Rated Output Power 120V	100	Watts	95	@ Nominal input voltage	
Rated Output Power 230V	105	Watts	100	@ Nominal input voltage	
Avgerage value - RMS Dynamic power	103	Watts	Reference	@ Nominal input voltage	3/20 50 Hz Burst unit driven 6dB above the sensitivity to drive it into max power, measured value is the average of the 4 first consecutive peaks
Dynamic power HP	134	Watts	Reference	@ Nominal input voltage	Highest RMS of the first 4 consecutive peaks
THD@ Rated Power	0.5	%	1	22K filter	
THD @ 1 Watt	0.1	%	0.3	22K filter	
DC Offset	10	mV-DC	50	@ Speaker Output	
Damping factor	>150	DF	100		terminals, Output power 90 Watts THD < 0.1 %
Input Sensitivity					
Input Frequency	50	Hz	50	Nominal Freq.	
Line Input (L&R)	15	mVrms	±2dB	To 1 Watt	Single input driven 1 input driven
LFE Input	9.5	mVrms	±2dB	To 1 Watt	LFE input driven only
System Gain-L and R inputs	42.27	dB	±2dB	Gain=130	Single input driven L or R
Signal to Noise					
SNR-A-Weighted	90	dBA	85	To Rated power	A-Weighting filter
SNR-unweighted	85	dBr	80	To Rated power	22KHz filter
SNR @ 1W-unweighted	65	dBr	60	To 1 Watt	22KHz filter
Residual Noise Floor	1	mVrms(max)	1.5	Volume @max, w/ A/P Swept Bandpass Measurement (Line freq.+ harmonics)	
Input Impedance					
Line input L&R , LFE	>10	K ohms	N/A	Nominal over the audio BW	Reference only
Filters					
Low Pass (fixed or variable)	Variable	--	±2dB	2nd order variable + 2nd order fix, Range 50-110 Hz	
Subsonic filter (HPF)	Fixed		±2dB		
Friend circuit	Fixed		±2dB		
Limiter (yes/no)	YES	--	N/A		
THD at Max. Output Power	N/A	--	N/A		
Features					
LFE Input	YES		Functional		BW Limited to 500 Hz,
Phase Switch (yes/no)	YES	--	Functional		
Volume pot Taper (lin/log)	LOG	--	Functional		
LP Variable Crossover contr	YES		Functional	Range 50-110 Hz	
ATO	YES		Functional	fs	
Input Configuration					
Line In (L,R)	L ,R	--	Functional		RCA inputs: RED-WHT, L , R Summed to Mono
Line level in LFE	LFE		Functional		Single connector
Signal Sensing (ATO)					
Auto-Turn-On (yes/no)	YES	--	Functional		
ATO Input Frequency	50	Hz	Functional		
ATO Level Line Level in (L,R	1.5	mV	Functional	2mV@50Hz into Line Input w/ 1 ch. driven	

Parameter	Specification	Unit	QA Test Limits	Conditions	Notes
ATO Turn-on time	< 1	Sec	Functional	Amp connected and AC on, then input signal applied	
Auto Mute/ Turn-OFF Time	10	minutes	Functional	T before muting, after signal is removed	Auto turn of time (T) must be 5 > T <15
Power on Delay time	3	sec.	Functional	AC Power Applied	
Transients/Pops					
ATO Transient	5	mV-peak	10	@ Speaker Outputs	
Turn-on Transient	50	mV-peak	100	@ Speaker Outputs	AC Line cycled from OFF to ON
Turn-off Transient	50	mV-peak	100	@ Speaker Outputs	AC Line cycled from ON to OFF
Efficiency					
Stand-by Input Power	13	Watts	14	@ nom. line voltage Unit active, no signal applied (Green LED)	Maximum allowable input power under nominal Input voltage and frequency, HOT or COLD operation.
Power Cons/Amps.@rated power 120V Model	192 / 1.89	Watts/Amps	208 / 2.00	@ 120V-60 Hz (Nom.line voltage)	100 Watts @ 4 Ohms nominal line voltage
Power Cons/Amps.@rated power230V Model	208 / 1.1	Watts/Amps	210 / 1.2	@ 230V-50 Hz (Nom.line voltage)	100 Watts @ 4 Ohms nominal line voltage
Protection					
Short Circuit Protection	YES	--	Functional	Direct short at output	
Thermal Protection	65 deg. C	--	Functional	@1/8 max unclipped Power	Temperature rise should not exceed 35K rise
DC Offset Protection	YES	--	Functional	DC present at Speaker Out leads	Relay or crowbar (for driver/fire protection)
Line Fuse Rating					
120VAC	2.5	Amps		Type-T or Slo Blo	External fuse with UL/SEMKO rated holder
230VAC	1.25	Amps		Type-T or Slo Blo	External fuse with UL/SEMKO rated holder

CONTROLS AND CONNECTIONS

Rear Panel

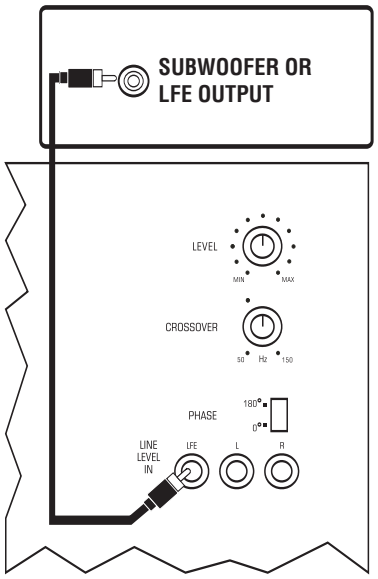


❶ Subwoofer-Level Control
❷ Crossover Adjustment
❸ Phase Switch
❹ LFE Input
❺ Line-Level Inputs
❻ Power Indicator LED
❼ Power Switch

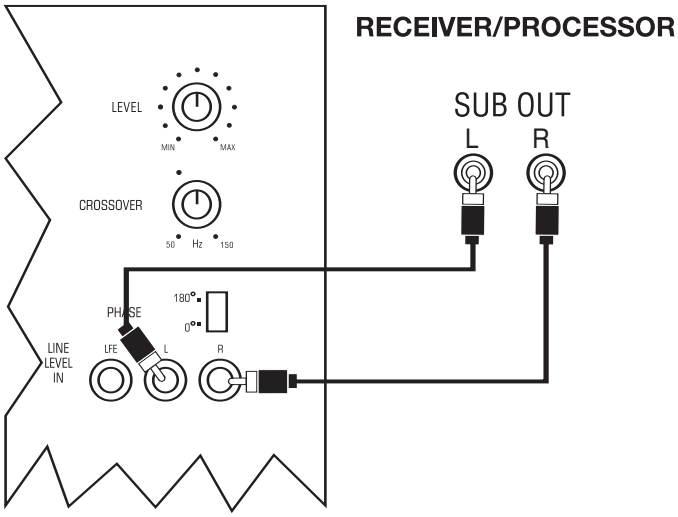
SUBWOOFER CONNECTIONS

Choose the Subwoofer Connection That Is Most Suitable for Your Receiver/Processor

If you have a Dolby® Digital or DTS® receiver/processor with a low-frequency-effects (LFE) or subwoofer output:



If your receiver/processor does not contain a Dolby Digital or DTS processor but has a subwoofer output:



NOTE: Some receivers have one subwoofer output.
In that case, it is recommended that you use a Y connector (not included) to maximize performance.

OPERATION

Power On

Plug your subwoofer's AC cord into a wall outlet. Do not use the outlets on the back of the receiver.

Initially set the Subwoofer-Level Control ❶ to the "min" position.

Turn on your sub by pressing the Power Switch ❼ on the rear panel.

Turn on your entire audio system and start a CD or movie soundtrack at a moderate level.

Auto On/Standby

With the Power Switch ❼ in the ON position, the LED ❻ on the rear panel will remain lit in red or green to indicate the On/Standby mode of the subwoofer.

RED = STANDBY (no signal detected, amp off)

GREEN = ON (signal detected, amp on)

The subwoofer will automatically enter the Standby mode after approximately 10 minutes when no signal is detected from your system. The subwoofer will then power ON instantly when a signal is detected. During periods of normal use, the Power Switch ❼ can be left on. You may turn off the Power Switch ❼ for extended periods of nonoperation, e.g., when you are away on vacation.

Adjust Level

Turn your Subwoofer-Level Control ❶ up to the "5" position (halfway). If no sound emanates from the subwoofer, check the AC-line cord and input cables. Are the connectors on the cables making proper contact? Is the AC plug connected to a "live" receptacle? Has the Power Switch ❼ been pressed to the "On" position? Once you have confirmed that the subwoofer is active, proceed by playing a CD, record or cassette. Use a selection that has ample bass information.

Set the overall volume control of the preamplifier or stereo to a comfortable level. Adjust the Subwoofer-Level Control ❶ until you obtain a pleasing blend of bass. Bass response should not overpower the room but rather be adjusted so there is a harmonious blend across the entire musical range. Many users have a tendency to set the subwoofer volume too loud, adhering to the belief that a subwoofer is there to produce lots of bass. This is not entirely true. A subwoofer is there to enhance bass, extending the response of the entire system so the bass can be felt as well as heard. However, overall balance must be maintained or the music will not sound natural. An experienced listener will set the volume of the subwoofer so its impact on bass response is always there but never obtrusive.

Phase Control

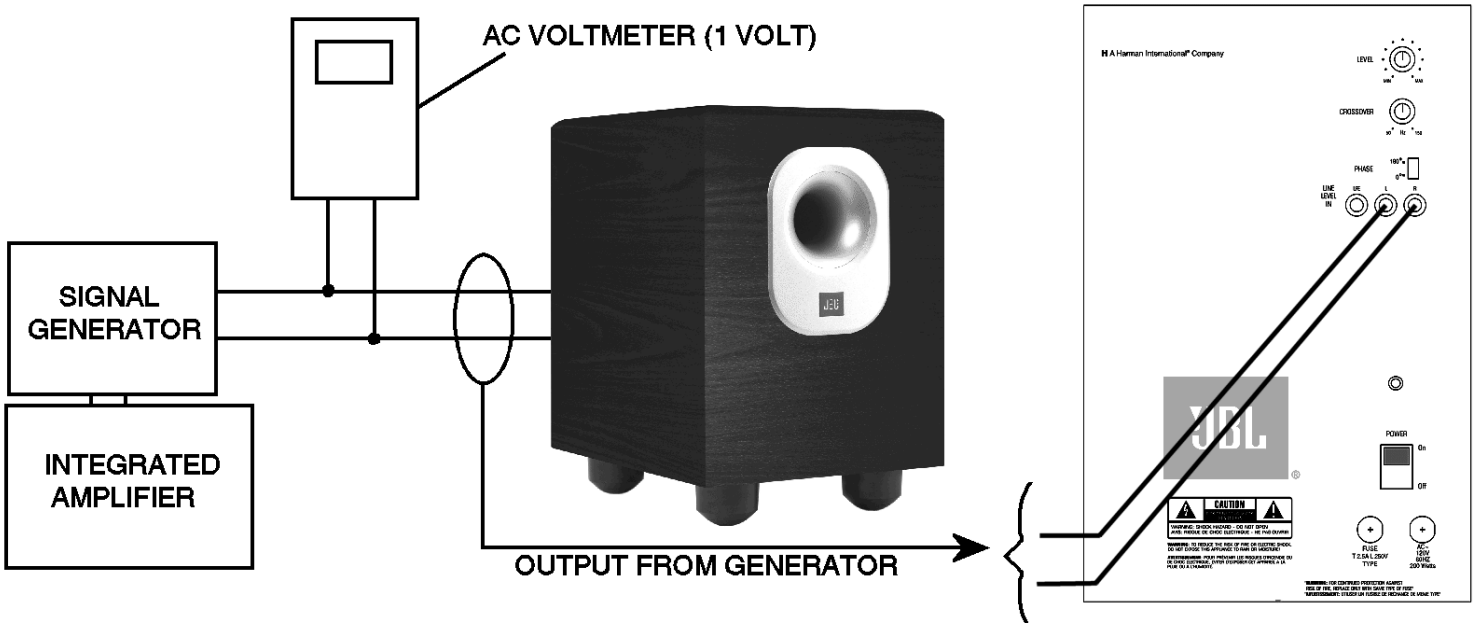
The Phase Switch ❸ determines whether the subwoofer speaker's piston-like action moves in and out with the main speakers (0˚), or opposite the main speakers (180˚). Proper phase adjustment depends on several variables such as room size, subwoofer placement and listener position. Adjust the phase switch to maximize bass output at the listening position.

Crossover Adjustments

The Crossover Adjustment Control ❷ determines the highest frequency at which the subwoofer reproduces sounds. If your main speakers can comfortably reproduce some low-frequency sounds, set this control to a lower frequency setting, between 50Hz and 100Hz. This will concentrate the subwoofer's efforts on the ultradeep bass sounds required by today's films and music. If you are using smaller bookshelf speakers that do not extend to the lower bass frequencies, set the Crossover Adjustment Control to a higher setting, between 120Hz and 150Hz.

NOTE: This control will have no effect if the LFE Input ❹ is used. If you have a Dolby Digital or DTS processor/receiver, the Low-Pass Frequency is set by the processor/receiver. Consult your owner's manual to learn how to view or change this setting.

BALBOA SUB10 Test Set Up and Procedure



SYSTEM AURAL SWEEP TEST
Equipment needed:

- Function/signal generator/sweep generator
- Integrated Amplifier
- Multimeter
- Speaker cables

General Unit Function (UUT = Unit Under Test)

Switches/knobs on the amplifier faceplate:
Low Pass Frequency Adjust full CW (150Hz)
Phase switch – either position

1. From the signal generator, Connect both right and left line level inputs (RCA) – not the LFE jack - to signal generator and UUT. Use Y-cable if necessary from mono source.
2. On the amplifier, turn the LEVEL control full Counterclockwise (Min).
3. Turn on generator, adjust to **100mV, 50 Hz**.
4. Plug in UUT; turn the power switch ON. Turn LEVEL control full Clockwise (Max).
5. LED should now be Green; immediate bass response should be heard and felt from rear port tube opening.
6. Turn off generator, turn LEVEL control fully Counterclockwise (Min), disconnect RCA cable.

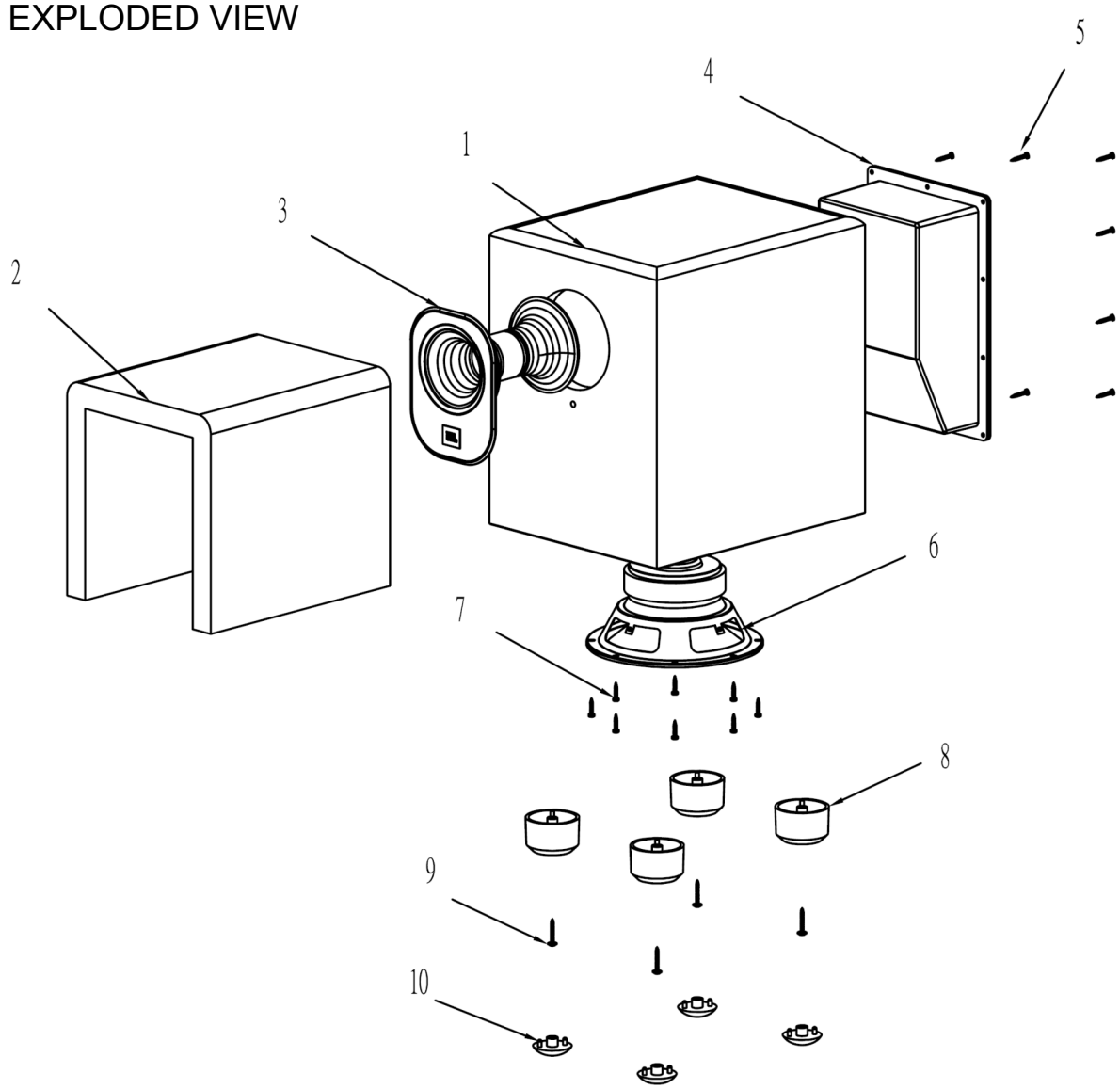
Sweep Function

1. Follow steps 1-6 above, using a sweep generator as a signal source.
2. Sweep generator from 20Hz to 1kHz. Listen to the cabinet and drivers for any rattles, clicks, buzzes or any other noises. If any unusual noises are heard, remove woofer and test.

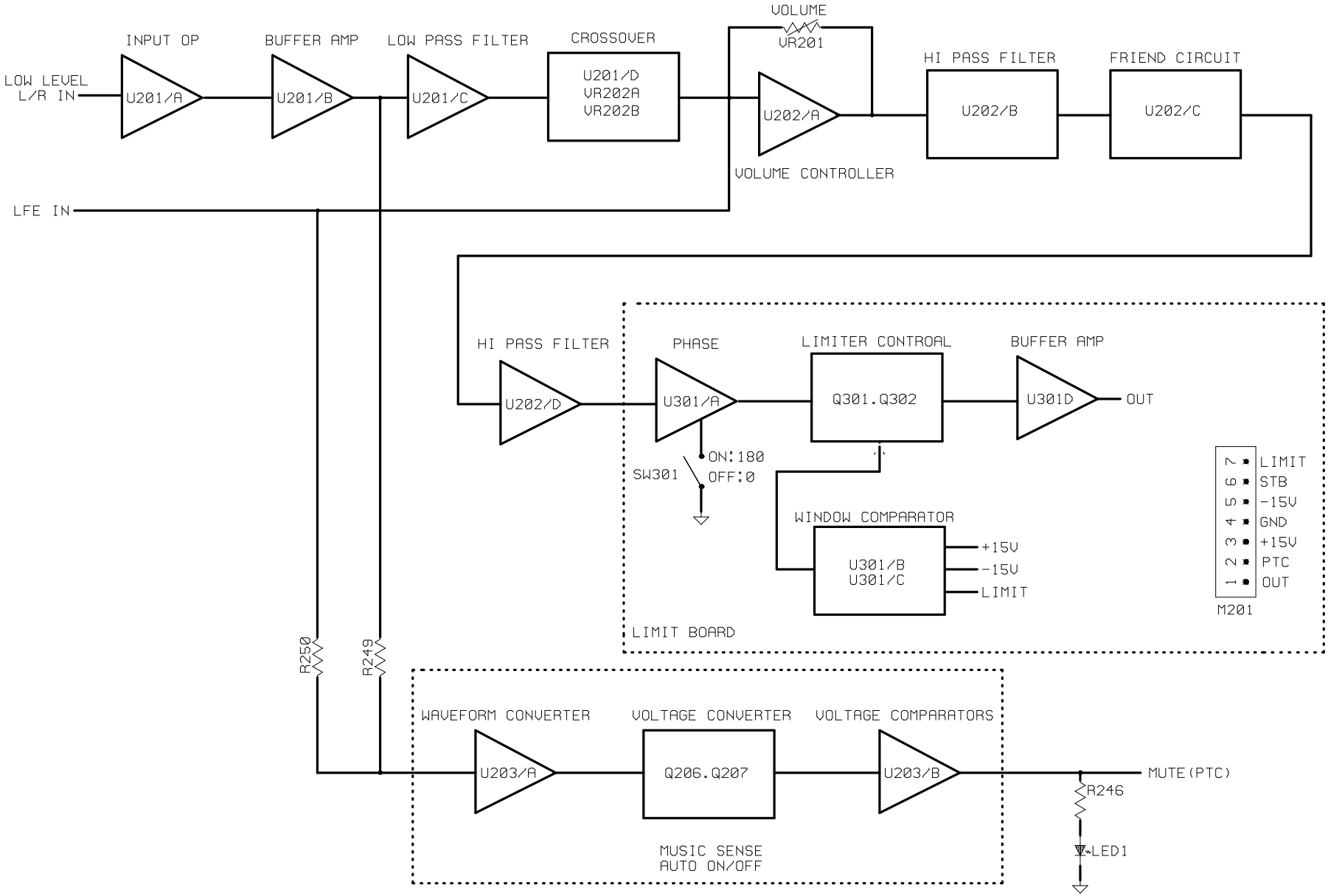
Driver Function (Woofer)

1. Remove woofer from cabinet; detach + and - wire clips.
2. Check DC resistance of woofer; it should be **3.3 ohms** ±10%.
3. Connect a pair of speaker cables to driver terminals. Cables should be connected to an integrated amplifier fed by a signal generator. Turn on generator and adjust so that speaker level output is **5.0**V.
4. Sweep generator from 20Hz to 1kHz. Listen to driver for any rubbing, buzzing, or other unusual noises.

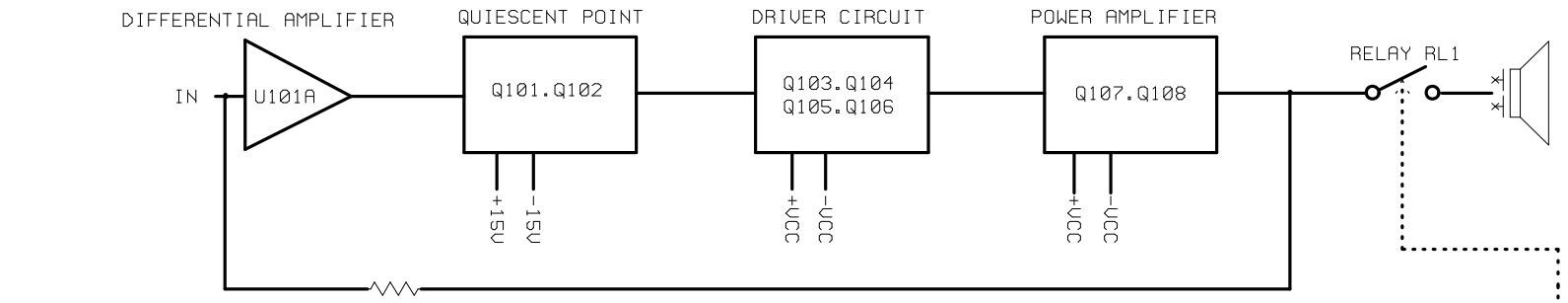
EXPLODED VIEW

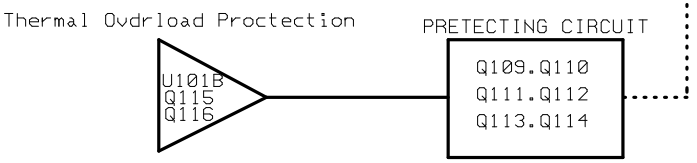


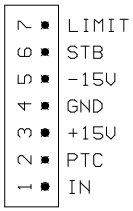
Item #	Part Number	Description	Qty
1	Not for Sale	BALBOASUB10/BALBOASUB10/230 cabinet	1
2	Not for Sale	Dacron(Acoustic Damping Material)	1
3	249-ABS-00175-0AAE	Port Tube	1
4	Not for Sale	Amplifier (120v or 230v)	1
5	352-AM04020D210-E	Screw, Amplifier	10
6	25MF12DZB-DW03-E	10” Woofer (DCR = 3.3 ohms)	1
7	352-FM04020D605-E	Screw, Woofer	8
8	321-ABS-00008-E	Feet, main Plastic body	4
9	352-HM04030D500-E	Screw, foot	4
10	321-RUB-00009-E	Feet, rubber bumpers	4

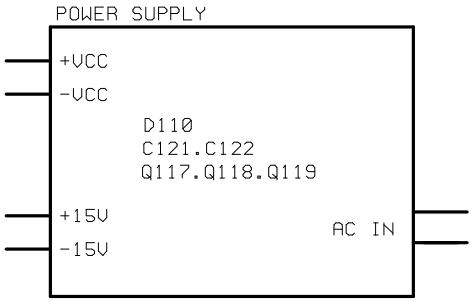


BALBOA SUB10(UL) BLOK DIAGRAM(PRE & LIMIT)





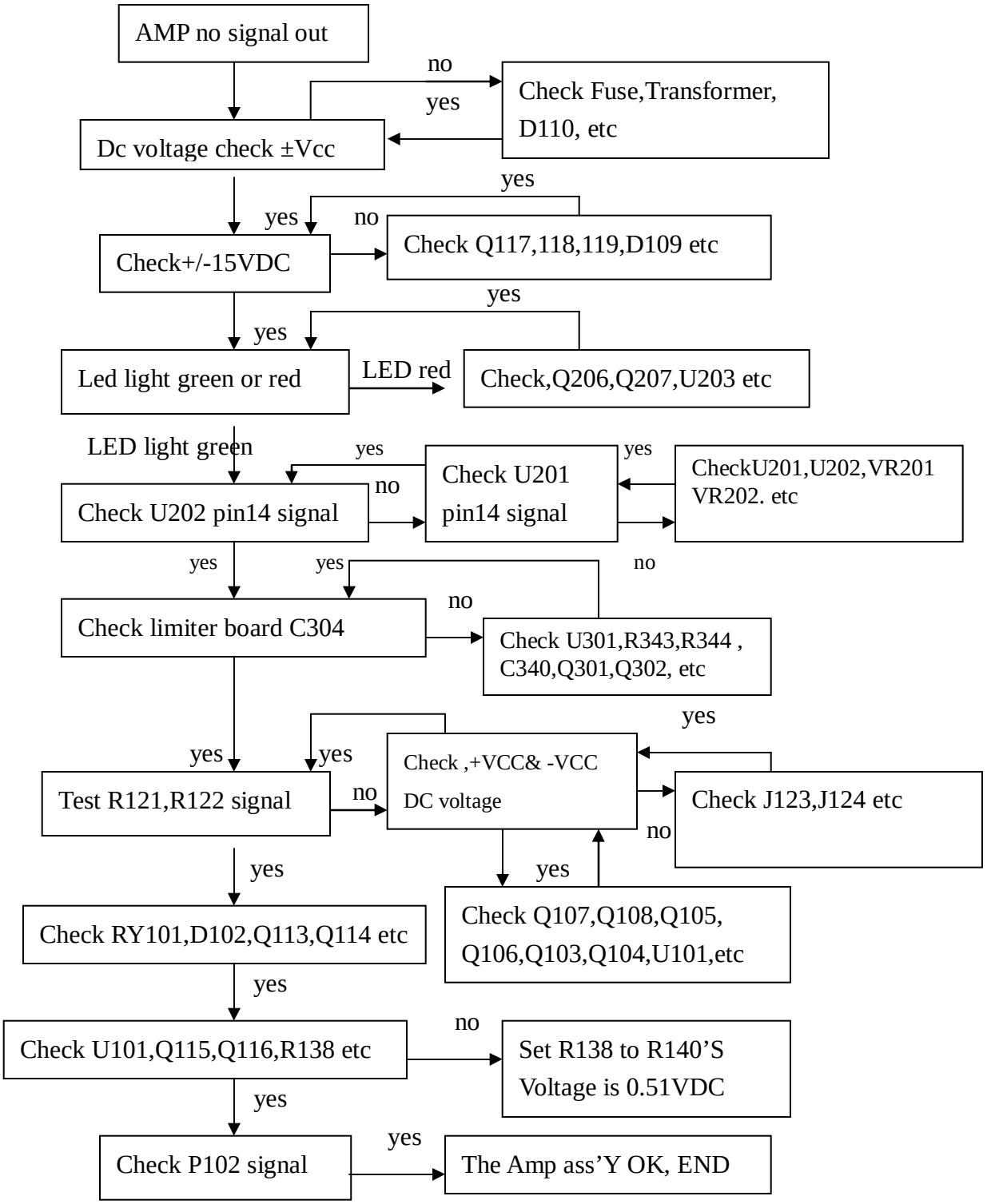




BALBOA SUB10(UL) BLOCK DIAGRAM(POWER AMPLIFIER.POWER SOURCE.PRETECT)

BALBOA SUB10 (UL) AMP

Troubleshooting Flow Chart

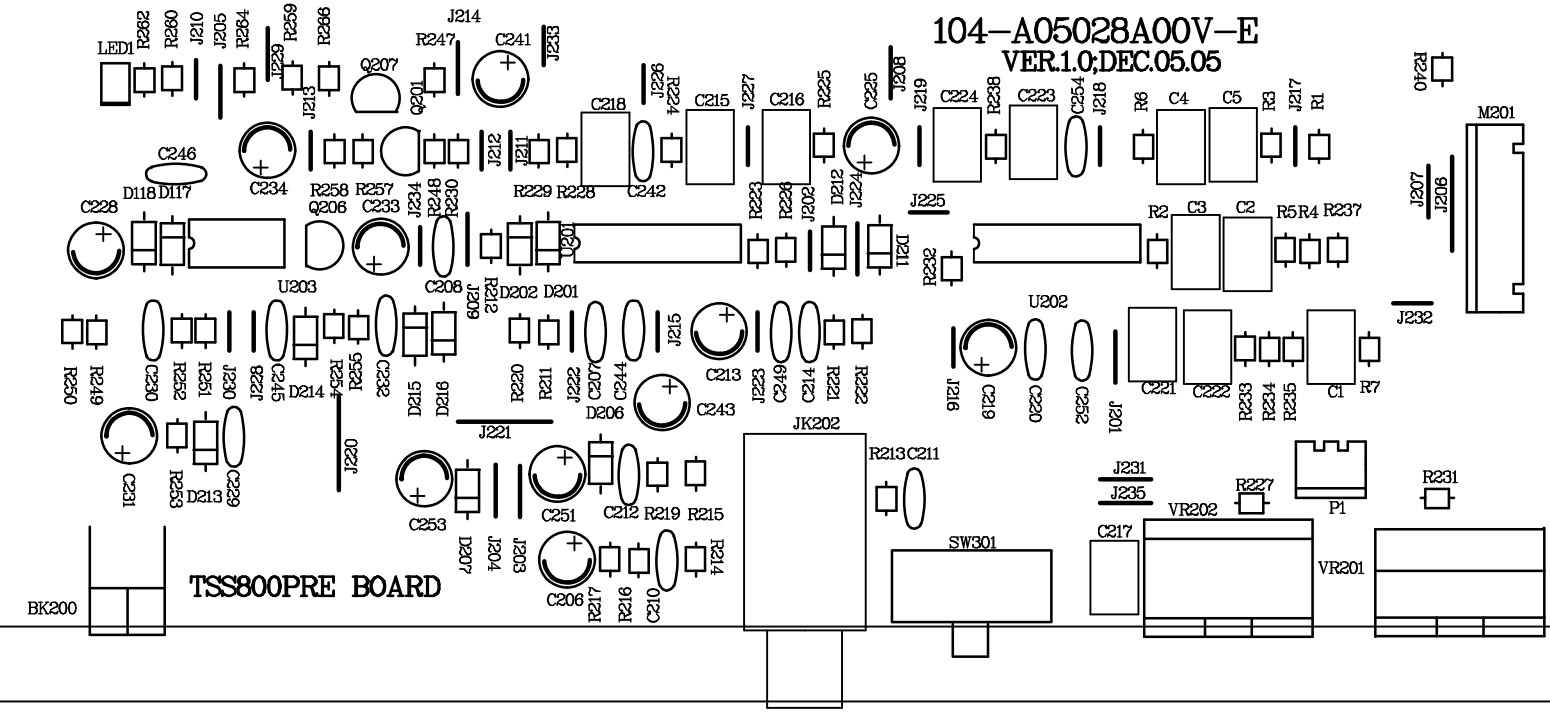


Balboa SUB10 (120v) Electrical Parts List			
Part Number	Description	Qty	Reference Designator
POWER/MAIN PCB			
Resistors			
110-14472j26-e	Resistor 4.7K 1/4W ±5% CF 26mm (RoHS)	2	R147,R150,
110-14681j26-e	Resistor 680Ω 1/4W ±5% CF 26mm (RoHS)	2	R148,R151,
110-16101j26-e	Resistor 100Ω 1/6W ±5% CF 26mm (RoHS)	1	R120,
110-16102j26-e	Resistor 1K 1/6W ±5% CF 26mm (RoHS)	1	R124,
110-16103j26-e	Resistor 10K 1/6W ±5% CF 26mm (RoHS)	1	R134,
110-16105j26-e	Resistor 1M 1/6W ±5% CF 26mm (RoHS)	1	R143,
110-16123j26-e	Resistor 12K 1/6W ±5% CF 26mm (RoHS)	2	R135,R139,
110-16152j26-e	Resistor 1.5K 1/6W ±5% CF 26mm (RoHS)	6	R103,R123,R136,R137,141,R142,
110-16153j26-e	Resistor 15K 1/6W ±5% CF 26mm (RoHS)	4	R118,R145,R152,R154,
110-16154j26-e	Resistor 150K 1/6W ±5% CF 26mm (RoHS)	1	R131,
110-16181j26-e	Resistor 180Ω 1/6W ±5% CF 26mm (RoHS)	2	R111,R114,
110-16182j26-e	Resistor 1.8K 1/6W ±5% CF 26mm (RoHS)	1	R153,
110-16223j26-e	Resistor 22K 1/6W ±5% CF 26mm (RoHS)	3	R128,R129,R133,
110-16332j26-e	Resistor 3.3K 1/6W ±5% CF 26mm (RoHS)	3	R106,R107,R144,
110-16392j26-e	Resistor 3.9K 1/6W ±5% CF 26mm (RoHS)	2	R105,R108,
110-16393j26-e	Resistor 39K 1/6W ±5% CF 26mm (RoHS)	1	R126,
110-16470j26-e	Resistor 47Ω 1/6W ±5% CF 26mm (RoHS)	4	R112,R113,R115,R116,
110-16471j26-e	Resistor 470Ω 1/6W ±5% CF 26mm (RoHS)	1	R140,
110-16472j26-e	Resistor 4.7K 1/6W ±5% CF 26mm (RoHS)	3	R110,R125,R130,
110-16473j26-e	Resistor 47K 1/6W ±5% CF 26mm (RoHS)	1	R101,
110-16560j26-e	Resistor 56Ω 1/6W ±5% CF 26mm (RoHS)	1	R117,
110-16563j26-e	Resistor 56K 1/6W ±5% CF 26mm (RoHS)	1	R104,
110-16682j26-e	Resistor 6.8K 1/6W ±5% CF 26mm (RoHS)	1	R109,
110-10821jk2-e	Resistor 820Ω 1W ±5% 10mm (RoHS)	1	R132,
110-122r2j15-e	Resistor 2.2Ω 1/2W ±5% 15mm (RoHS)	1	R127,
110-20331jk2-e	Resistor 330Ω 2W ±5% 5mm(RoHS)	2	R146,R149,
113-50r10j10-e	cement Resistor 0.1Ω 5W ±5% (RoHS)	2	R121,R122,
114-03302m0-e	semi-fixed Resistor 3K 0.3W ±20%(RoHS)	1	R138,
Capacitors			
130-2b102k503-e	disc capacitor 1000P 50V ±10% (RoHS)	1	C116,
130-3f104z503-e	disc capacitor 0.1U 50V +80/-20% (RoHS)	4	C108,C113,C115,C119,
130-3f473m503-e	disc capacitor 0.047U 50V ±20% (RoHS)	1	C106,
130-sl101k503-e	disc capacitor 100P 50V SL ±10% (RoHS)	2	C139,C140,
132-104j503-e	mylar capacitor 0.1U 50V ±5% (RoHS)	1	C107,
132-223ja03-e	mylar capacitor 0.022uF 100V ±5% (RoHS)	4	C124,C125,C126,C128,
135-3105m50-e	electrolytic cap. 1U 50V ±20% (RoHS)	2	C105,C112,
135-3107m16-e	electrolytic cap. 100uF 16V ±20% (RoHS)	3	C109,C117,C120,
135-3226m50-e	electrolytic cap. 22U 50V ±20% (RoHS)	2	C114,C118,
135-3227m10-e	electrolytic cap. 220U 10V ±20% (RoHS)	2	C129,C130,
135-3227m16-e	electrolytic cap. 220U 16V ±20% (RoHS)	1	C111,
135-3476m25-e	electrolytic cap. 47U 25V ±20% (RoHS)	1	C103,
132-223ja03-e	mylar capacitor 0.022uF 100V ±5% (RoHS)	2	C123,C127,
135-3107m16-e	electrolytic cap. 100uF 16V ±20% (RoHS)	1	C110,
135-4688m50-e	electrolytic cap. 6800U/50V ±20%D25X45mm (RoHS)	2	C121,C122,
Semiconductors			
192-027c1815gr-e	transistor 2SC1815GR TOSHIBA(RoHS) NPN	5	Q102,Q111,Q112,Q113,Q118,
192-028a1015gr-e	transistor 2SA1015GR TOSHIBA(RoHS) PNP	2	Q114,Q116,
192-1572n5551-e	*transistor FSC 2N5551 (RoHS) NPN	2	Q103,Q109,
192-1582n5401-e	transistor FSC 2N5401 AI-PNP 350V 500mA TO-92 (RoHS) PNP	2	Q104,Q110,
197-031n4148-e	diode 100mA 75V SIGNAL 1N4148 ROHM (RoHS)	4	D101,D103,D105,D108,
199-15000335-e	zener diode 3.3V 1/2W 52mm (RoHS)	1	D102,
199-15000625-e	zener diode HZ6C2 RENESAS (RoHS)	2	D106,D107,
199-15001605-e	zener diode HZ16-2 RENESAS (RoHS)	1	D109,

Part Number	Description	Qty	Reference Designator
POWER/MAIN PCB			
190-06m4558d-e	I.C. OPA 4558D (RoHS) DUAL OP-AMP	1	U101,
192-021tip35c-e	transistor TIP35C (RoHS) NPN	1	Q107,
192-022tip36c-e	transistor TIP36C (RoHS) PNP	1	Q108,
192-201d882y-e	*transistor KSD882Y (RoHS) NPN	1	Q117,
192-202b772y-e	*transistor KSB772Y (RoHS) PNP	1	Q119,
192-027c1815gr-e	transistor 2SC1815GR TOSHIBA(RoHS) NPN	2	Q101,Q115,
192-991d669a-e	transistorHI-SINCERITY HSD669A(RoHS) NPN	1	Q106,
192-992b649t-e	transistor HSB649T (RoHS) PNP	1	Q105,
197-00kbl405-e	diode 4A 500V KBL405(RoHS) BRIDGE	1	D110,
197-101n4002-e	diode 1N4002TB (RoHS)	1	D104,
Miscellaneous			
171-udhss124d-e	Relay 5A 24V UDH-SS124D(RoHS)	1	RY101,
175-1c07v01-e	wire connector&base 7PIN PITCH=2.5mm (RoHS)	1	P101,
175-1d02v01-e	wire connector&base 2PIN PITCH=3.96mm(RoHS)	1	P102,
175-1d03v01-e	wire con&base 3 PIN PITCH=3.96mmJST-VH discard middle PIN	1	P103,
193-3m2520-e	insulation TO-3P 25x20mm (RoHS)	2	for Q107,Q108,
323-AL-00020-0LAE	HEAT SINK 65*32*31 AL	1	
351-AM03014A094-E	M3*14 machine screw (RoHS)	1	
352-AM03008D040-E	¢ 3*8 B ping screw (RoHS)	4	
361-FE-00051-0LAE	transistor holder 14.2*8.0*5.2t=1.6mm (RoHS)	1	
361-NYL-00054-0LAE	transistor insulation (SW06002) (RoHS)	2	
PREAMP PCB			
Resistors			
110-16102j26-e	Resistor 1K 1/6W ±5% CF 26mm (RoHS)	5	R213,R214,R215,R254,R253,
110-16103j26-e	Resistor 10K 1/6W ±5% CF 26mm (RoHS)	11	R212,R216,R217,R220,R221,R222,R225, R232,R235,R240,R228,
110-16104j26-e	Resistor 100K 1/6W ±5% CF 26mm (RoHS)	2	R231,R266,
110-16105j26-e	Resistor 1M 1/6W ±5% CF 26mm (RoHS)	1	R259,
110-16122j26-e	Resistor 1.2K 1/6W ±5% CF 26mm (RoHS)	1	R264,
110-16183j26-e	Resistor 18K 1/6W ±5% CF 26mm (RoHS)	3	R262,R226,R227,
110-16205j26-e	Resistor 2M 1/6W ±5% CF 26mm (RoHS)	1	R257,
110-16223j26-e	Resistor 22K 1/6W ±5% CF 26mm (RoHS)	2	R250,R255,
110-16224j26-e	Resistor 220K 1/6W ±5% CF 26mm (RoHS)	1	R251,
110-16333j26-e	Resistor 33K 1/6W ±5% CF 26mm (RoHS)	1	R249,
110-16472j26-e	Resistor 4.7K 1/6W ±5% CF 26mm (RoHS)	2	R258,R260,
110-16473j26-e	Resistor 47K 1/6W ±5% CF 26mm (RoHS)	1	R219,
110-16474j26-e	Resistor 470K 1/6W ±5% CF 26mm (RoHS)	1	R252,
110-16512j26-e	Resistor 5.1K 1/6W ±5% CF 26mm (RoHS)	3	R211,R229,R230,
116-161002f26-e	metal film Resistor 10K 1/6W ±1% MF 26mm (RoHS)	1	R7,
116-161471f26-e	metal film Resistor 1.47K 1/6W ±1% MF 26 mm (RoHS)	1	R4,
116-161503f26-e	metal film Resistor 150.0K 1/6W ±1% MF 26mm (RoHS)	1	R1,
116-161542f26-e	metal film Resistor 1/6W 15.4K 1% 26mm (RoHS)	2	R237,R238,
116-162400f26-e	metal film Resistor 240Ω 1/6W ±1% MF 26 mm (RoHS)	1	R2,
116-162871f26-e	metal film Resistor 2.87k 1/6W ±1% MF 26 mm (RoHS)	1	R234,
116-163602f26-e	metal film Resistor 36K 1/6W ±1% MF 26mm (RoHS)	1	R233,
116-165361f26-e	metal film Resistor 5.36k 1/6W ±1% MF 26 mm (RoHS)	1	R6,
116-1664r9f26-e	metal film Resistor 64.9Ω1/6W ±1% MF 26 mm (RoHS)	1	R5,
116-166801f26-e	metal film Resistor 6.8K 1/6W ±1% MF 26mm (RoHS)	2	R224,R223,
116-168251f26-e	metal film Resistor 8.25K 1/6W ±1% MF 26mm (RoHS)	1	R3,
115-h203b208-e	variable Resistor B20K (RoHS) CROSSOVER	1	VR202,
115-h503a104-e	variable Resistor D16 50K/1 A (RoHS) VOLUME	1	VR201,
Capacitors			
129-a104j633-e	metalized cap. 0.1U 63V ±5% MSC (RoHS)	2	C5,C215,
129-a153j633-e	metalized cap. 0.015U 63V MSC (RoHS)	1	C224,

Part Number	Description	Qty	Reference Designator
PREAMP PCB			
129-a154j633-e	metalized cap. 0.15U 63V ±5% MSC (RoHS)	1	C218,
129-a274j633-e	metalized cap. 0.27uf 63V ±5% (RoHS)	1	C216,
129-a473j633-e	metalized cap. 0.047U 63V ±5% MSC (RoHS)	1	C4,
129-a474j633-e	metalized cap. 0.47U 63V ±5% MSC (RoHS)	2	C221,C222,
129-a563j633-e	metalized cap. 0.056uF 63V ±5% MSC (RoHS)	1	C217,
130-2b221k503-e	disc capacitor 220P 50V ±10% (RoHS)	9	C207,C208,C210,C211,C212,C214,C220, C230,C249,
130-3f104z503-e	disc capacitor 0.1U 50V +80/-20% (RoHS)	7	C232,C242,C244,C245,C246,C252,C254,
130-ch220k503-e	disc capacitor 22PF CH 50V±10% (RoHS)	1	C229,
132-103j503-e	mylar capacitor 0.01uF 50V ±5% (RoHS)	1	C223,
135-3105m50-e	electrolytic cap. 1U 50V ±20% (RoHS)	1	C228,
135-3106m50-e	electrolytic cap. 10uF 50V ±20% (RoHS)	8	C206,C213,C219,C231,C241,C243,C251,C253
135-3107m16-e	electrolytic cap. 100uF 16V ±20% (RoHS)	2	C233,C234,
135-3226m50-e	electrolytic cap. 22U 50V ±20% (RoHS)	1	C225,
Semiconductors			
192-027c1815gr-e	transistor 2SC1815GR TOSHIBA(RoHS) NPN	2	Q206,Q207,
197-031n4148-e	diode 100mA 75V SIGNAL 1N4148 ROHM (RoHS)	9	D201,D202,D118,D117,D207,D206,D211,D212,D214,
199-15000515-e	zener diode 5.1V 1/2W 52mm (RoHS)	1	D213,
190-06m4558d-e	I.C. OPA 4558D (RoHS) DUAL OP-AMP	1	U203,
190-16tl074cn-e	*I.C TL074CN ST (RoHS) QUAD OP-AMP	2	U201,U202,
195-10204hgw-e	two color LED 204HGW 3¢ (RoHS)	1	D209,
Miscellaneous			
162-50159201-e	WIRE ASS'Y 2PIN 150mm white/red (RoHS)	1	
174-0rca326p-e	JACK RCA-326 (RoHS)	1	JK202,
180-tms7210v-e	SWITCH SLIDE 6PIN MS7210V (RoHS) PHASE	1	SW301,
362-FE-00041-0LAE	PCB support 11.75*8.5*12.5H (RoHS)	1	
LIMITER PCB			
Resistors			
110-16103j26-e	Resistor 10K 1/6W ±5% CF 26mm (RoHS)	8	R301,R303,R304,R308,R309,R314,R340,R344
110-16183j26-e	Resistor 18K 1/6W ±5% CF 26mm (RoHS)	1	R302,
110-16223j26-e	Resistor 22K 1/6W ±5% CF 26mm (RoHS)	2	R310,R312,
110-16273j26-e	Resistor 27K 1/6W ±5% CF 26mm (RoHS)	1	R341,
110-16333j26-e	Resistor 33K 1/6W ±5% CF 26mm (RoHS)	1	R305,
110-16472j26-e	Resistor 4.7K 1/6W ±5% CF 26mm (RoHS)	2	R342,R343,
110-16474j26-e	Resistor 470K 1/6W ±5% CF 26mm (RoHS)	1	R307,
110-16751j26-e	Resistor 750Ω 1/6W ±5% CF 26mm (RoHS)	2	R311,R313,
110-16755j26-e	Resistor 7.5M 1/6W ±5% CF 26mm (RoHS)	1	R306,
Capacitors			
130-3f104z503-e	disc capacitor 0.1U 50V +80/-20% (RoHS)	2	C305,C306,
132-103j503-e	mylar capacitor 0.01uF 50V ±5% (RoHS)	2	C302,C303,
135-3226m50-e	electrolytic cap. 22U 50V ±20% (RoHS)	2	C301,C340,
135-3476m25-e	electrolytic cap. 47U 25V ±20% (RoHS)	1	C304,
Semiconductors			
192-027c1815gr-e	transistor 2SC1815GR TOSHIBA(RoHS) NPN	2	Q301,Q302,
197-031n4148-e	diode 100mA 75V SIGNAL 1N4148 ROHM (RoHS)	2	D301,D302,
190-16tl074cn-e	*I.C TL074CN ST (RoHS) QUAD OP-AMP	1	U301,

Part Number	Description	Qty	Reference Designator
LIMITER PCB			
Miscellaneous			
162-50289001-e	CABLE ASS'Y wire 280mm AWG26 WHT (RoHS)	1	
162-80098201-e	wire 90mm 28AWG (RoHS)	1	SW301,
175-9f40hr2-e	wire connector&base 40PIN PITCH=2.54mm HR2*40 (RoHS)	0.15	P301,
104-tlx1100av-e	PCB 4connectors (RoHS)	0.25	
MISCELLANEOUS/MECHANICAL			
123-14j70d-e	Ferrite Core U-16.3*8.2*13(J70)+CASE (RoHS)	1	
130-3f472md00-e	disc capacitor 4700P 400V ± 20% (RoHS)	1	C001
150-e8604107-e	Power transformer EI-86 60Hz 120V TT0869906580	1	
152-u602015-e	power line cord SVT FT-26FT (RoHS)	1	
154-u25006t0-e	fuse 2.5A 250V 20mm (RoHS)	1	
155-520020-e	holder R3-11 (RoHS)	1	
162-10151001-e	WIRE UL1617 150mm 22AWG BROWN 6:6 (RoHS)	1	
162-50652003-e	WIRE 650mm RED=205# 0.5T BLK=110# 0.5T (RoHS)	1	
176-wjce1-e	wire connector pin CE-1 (RoHS)	1	
180-prf1003s-e	Power Switch ROCK RF-1003-BB2-OHA(RoHS)	1	
302-AL-05090-1LAE	rear board 300*200*2.5T BALBOA 120V (RoHS)	1	
306-ABS-00177-0BAE	rear housing 198*298*102mm (RoHS)	1	
311-ABS-00028-0BAE	Knob 46077-W P.V.C.(RoHS)	2	
320-RUB-00033-0BAE	rubber foot pad 25*21*4t (RoHS)	4	
323-AL-00141-0LAE	HEAT SINK 117.5*71.5*25 (RoHS)	1	
333-EVA-00783-0BAE	GASKET W 198*12*2.0T	2	
333-EVA-00807-0BAE	GASKET L 274*12*2.0T (RoHS)	2	
333-EVA-00826-0BAE	GASKET W 198*12*1.0T (RoHS)	2	
333-EVA-00835-0BAE	GASKET L 274*12*1.0T (RoHS)	2	
333-SPG-00876-0BAE	sphaeraster(SPG) 400*50*5T (RoHS)	1	
335-NYL-05015-0BAE	wire clip SB4F-2 black (RoHS)	2	
337-CU-00101-0LAE	metal foil 65L*50W (RoHS)	1	
350-EM04012D024-E	4℄*12 wood screw (RoHS)	4	
351-AM03008A079-E	M3*8 machine screw (RoHS)	7	
351-HM04016A218-E	M4*16 machine screw(RoHS)	4	
352-AM03008D040-E	℄3*8 B ping screw (RoHS)	8	
352-AM03010D065-E	℄3*10 P ping screw (RoHS)	1	
354-GM04002-E	M4 nut with pad (RoHS)	4	
362-FE-00013-0LAE	PCB support L TYPE t=1.6mmS.P.C.C 89*9*1.6T (RoHS)	2	


104-A05028A00V-E
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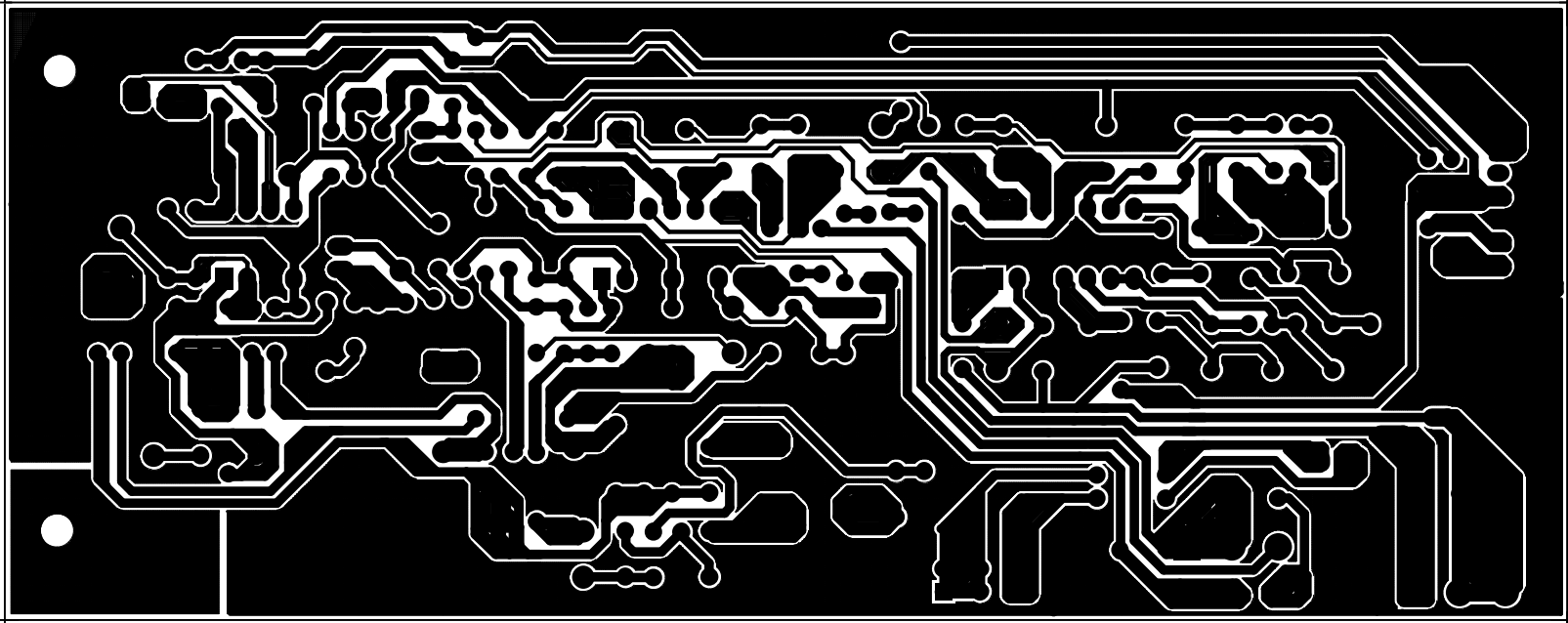
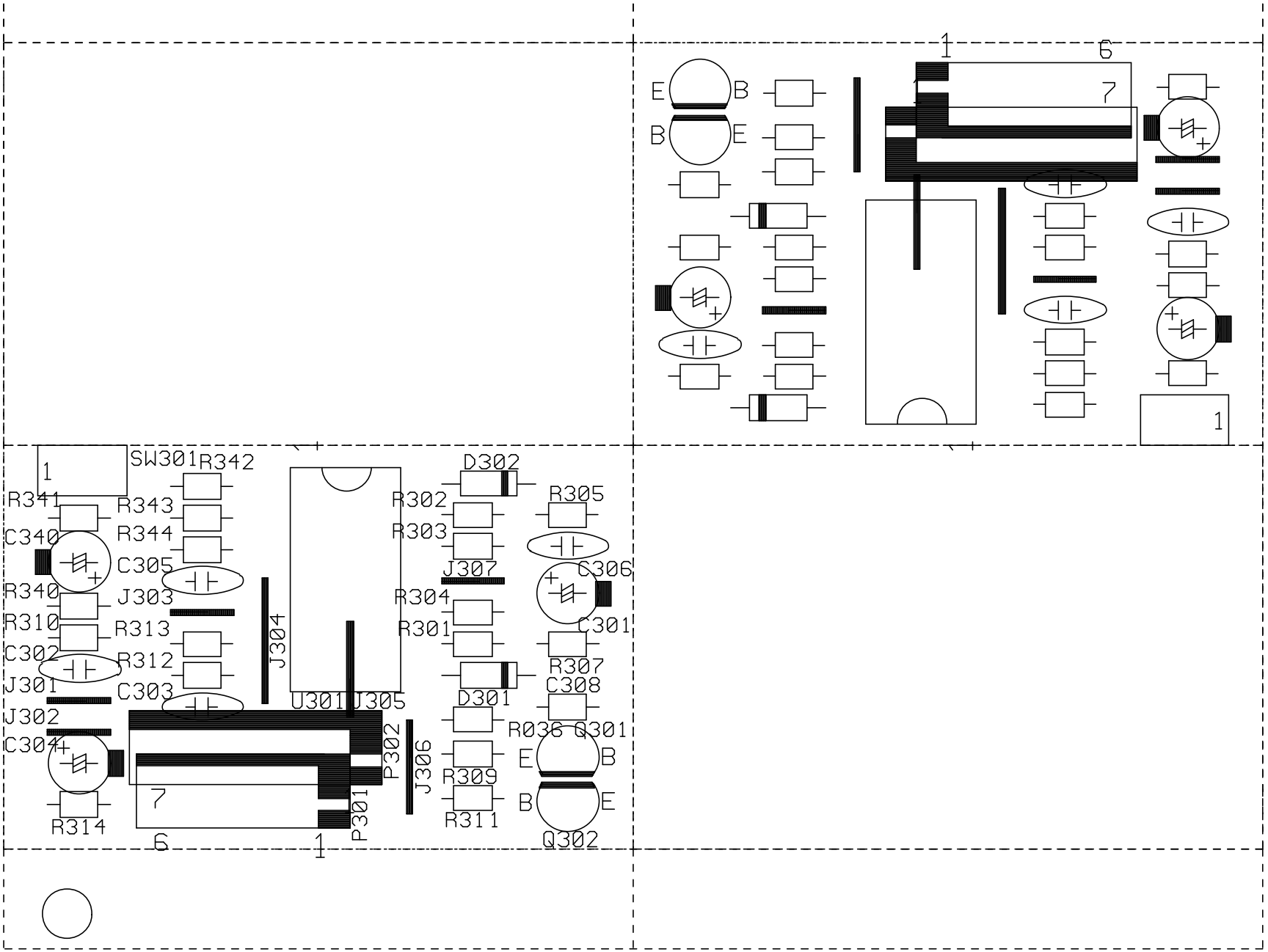
TSS800PRE BOARD
LED1
M201
SW301
VR201
VR202
JK202
BK200
P1

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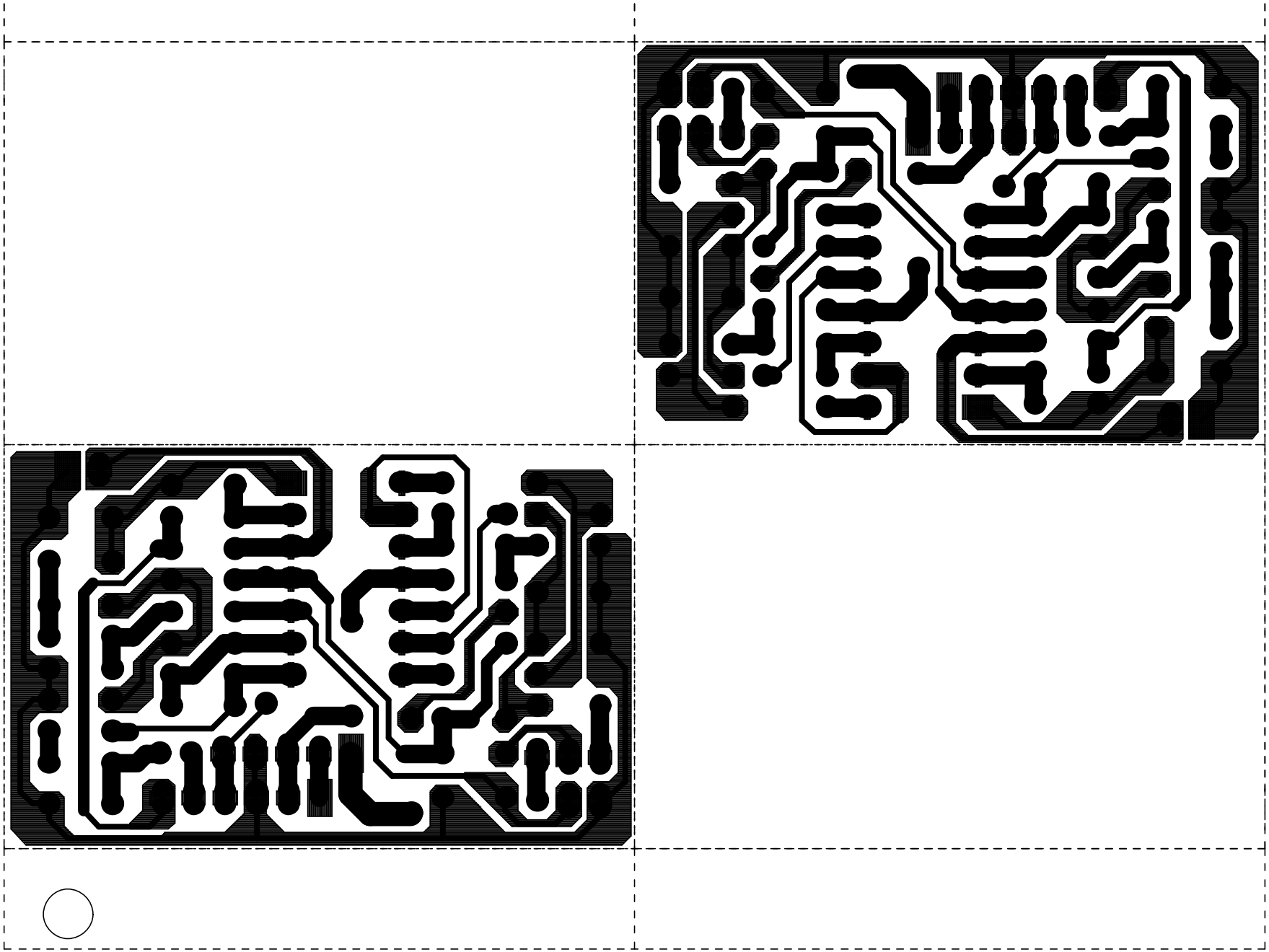

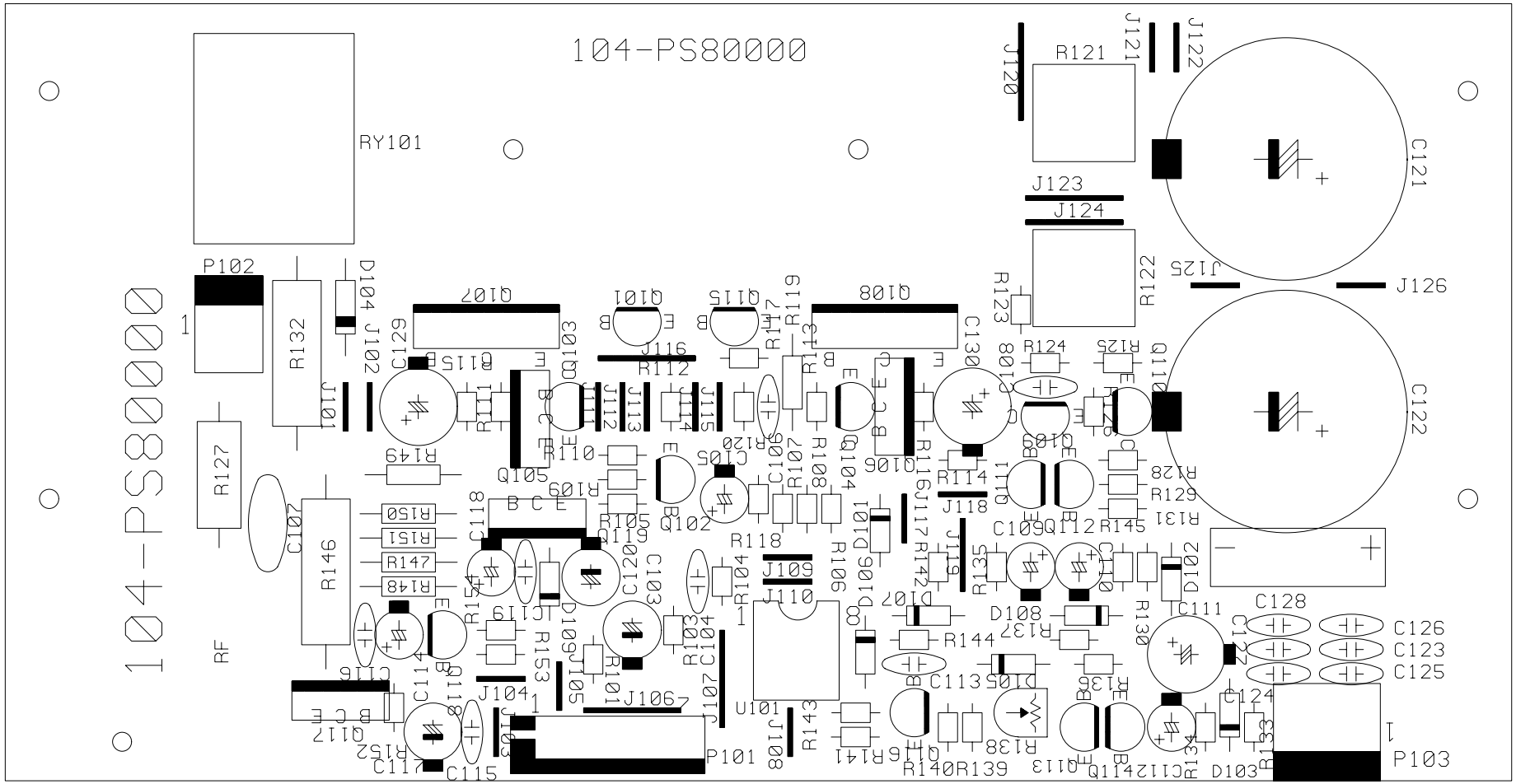

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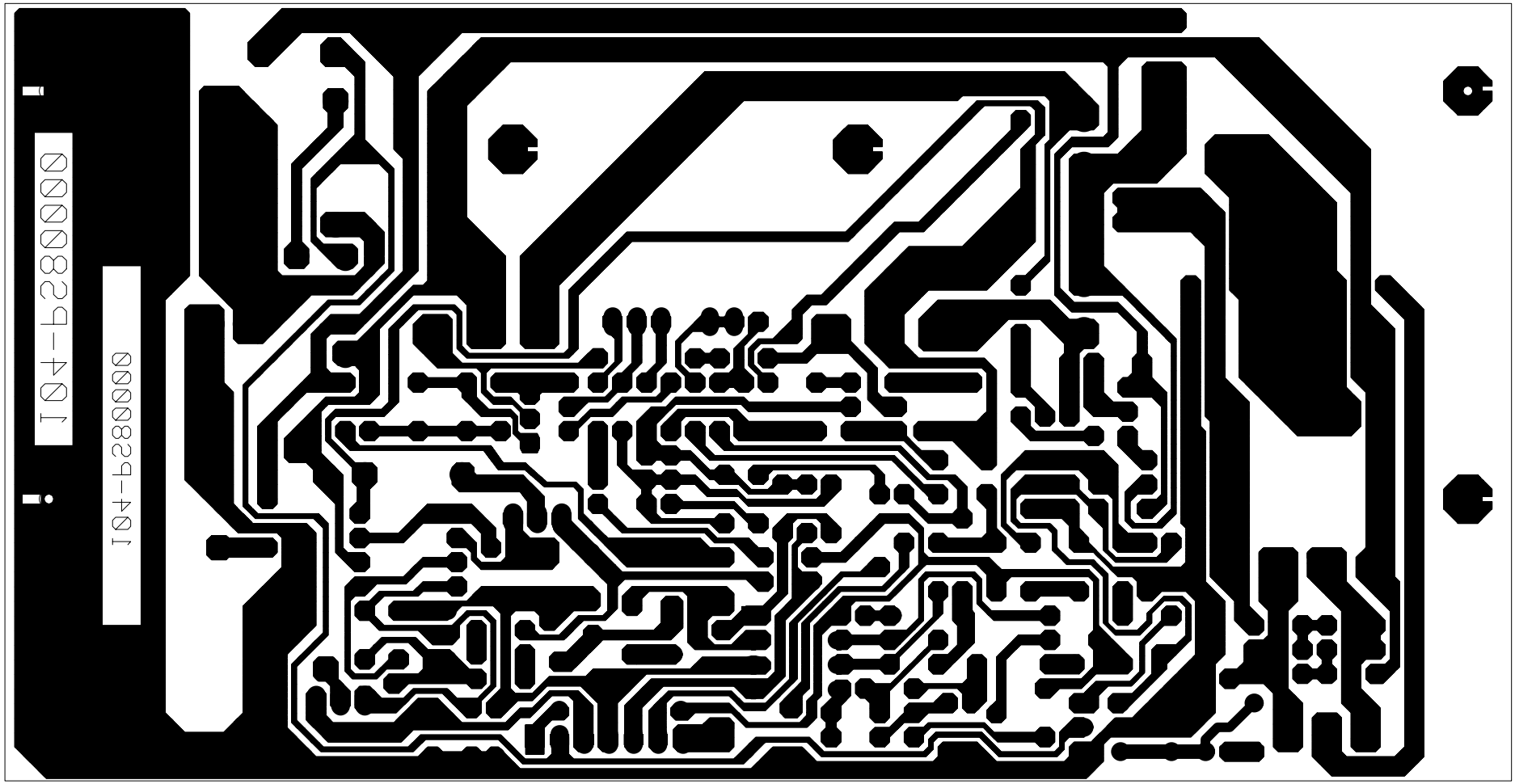
MATERIAL : TSS-8Γ	2
LAYER	3



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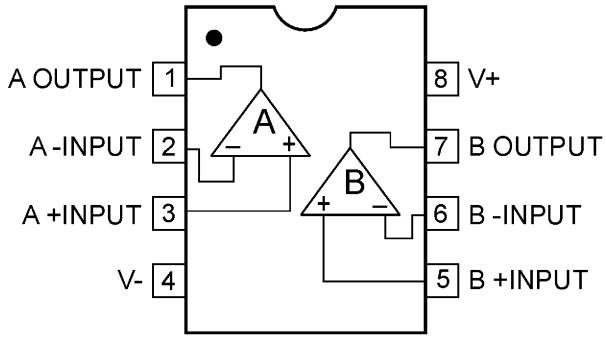
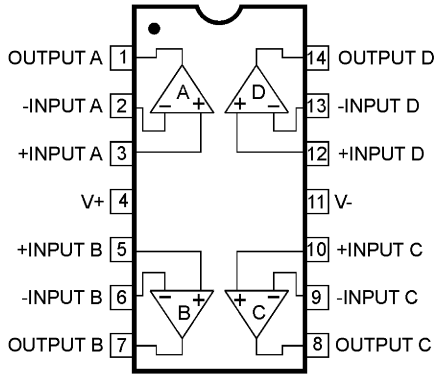
							MATERIAL :	2
							LAYER	3

Integrated Circuit Diagrams

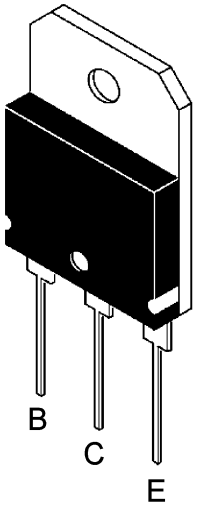
4558 Dual Op Amp
U101,203



OPAMP, QUAD 14P DIL TL074
U201, 202, 301



TIP35C, TIP36C
Q107,108



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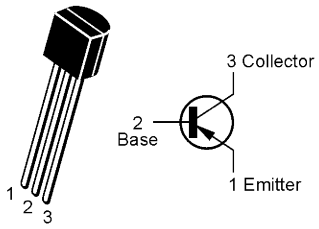

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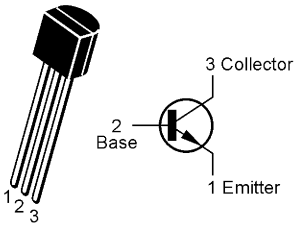

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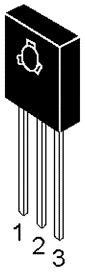
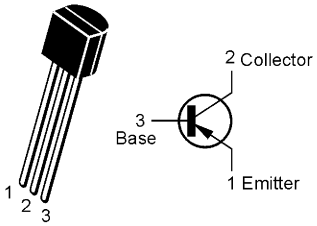
KSB772 , KSD882
Q105, 106 ,117,119



1. Emitter
2. Collector
3. Base

2SA1015
Q114,116



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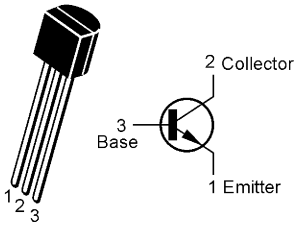
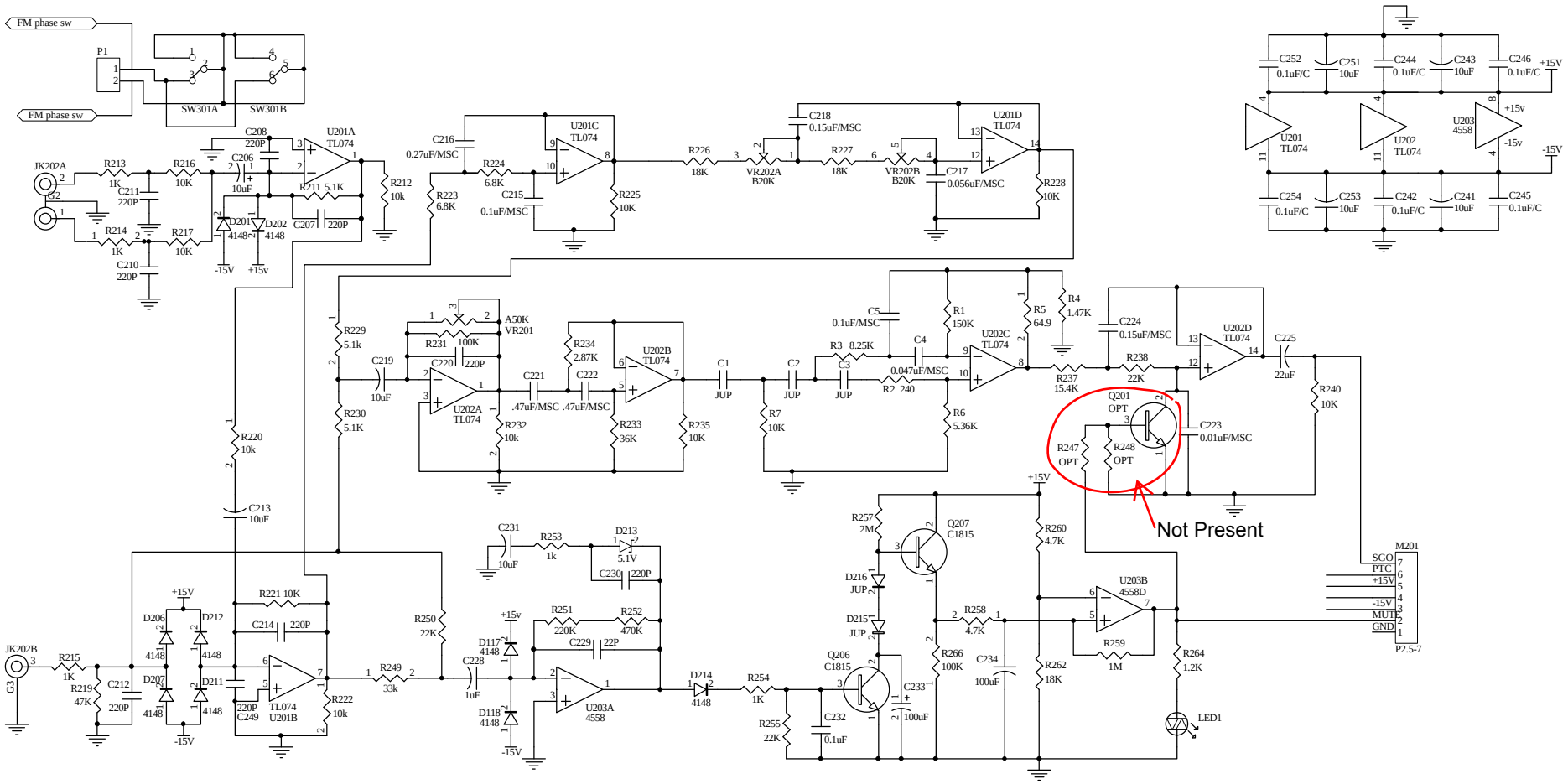
206,207,301,302.





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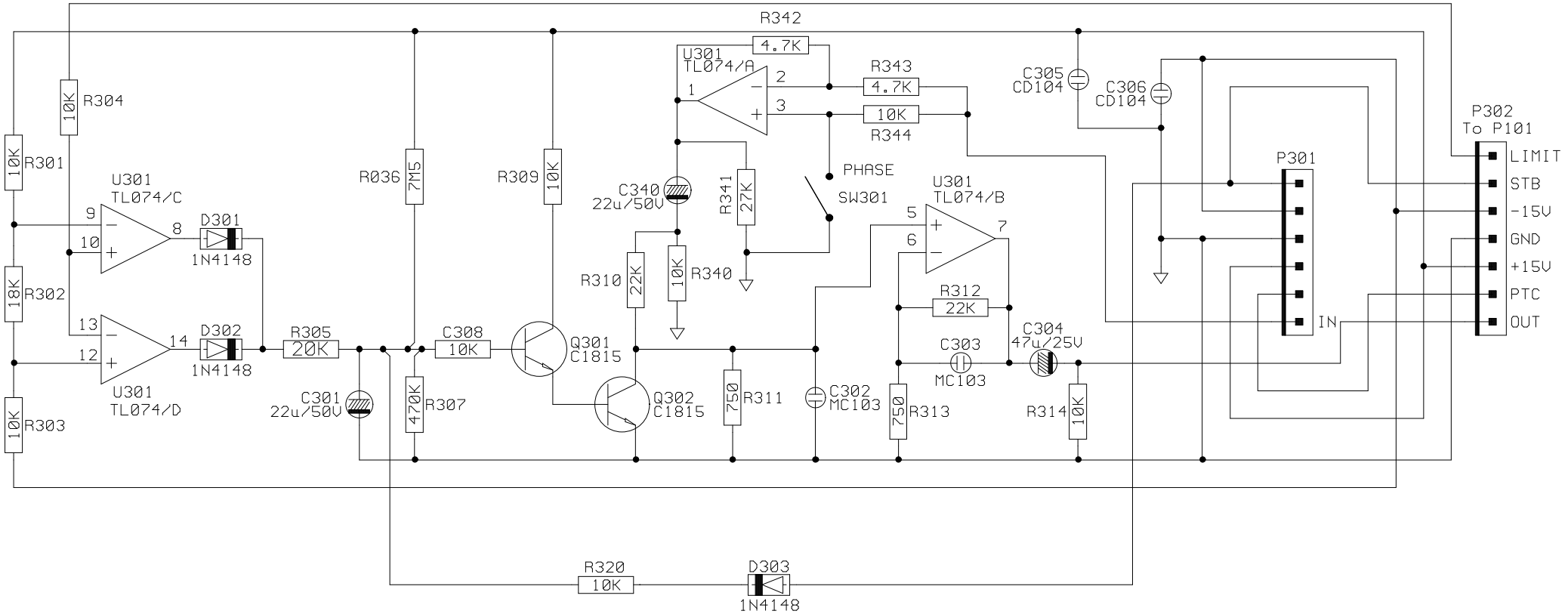
						MODEL NO. BALBOA SUB10 BK	PAGE: 1 / 3
						CUSTOMER: JBL	
						DATE: 2006-09-20	

BALBOA SUB10 BK



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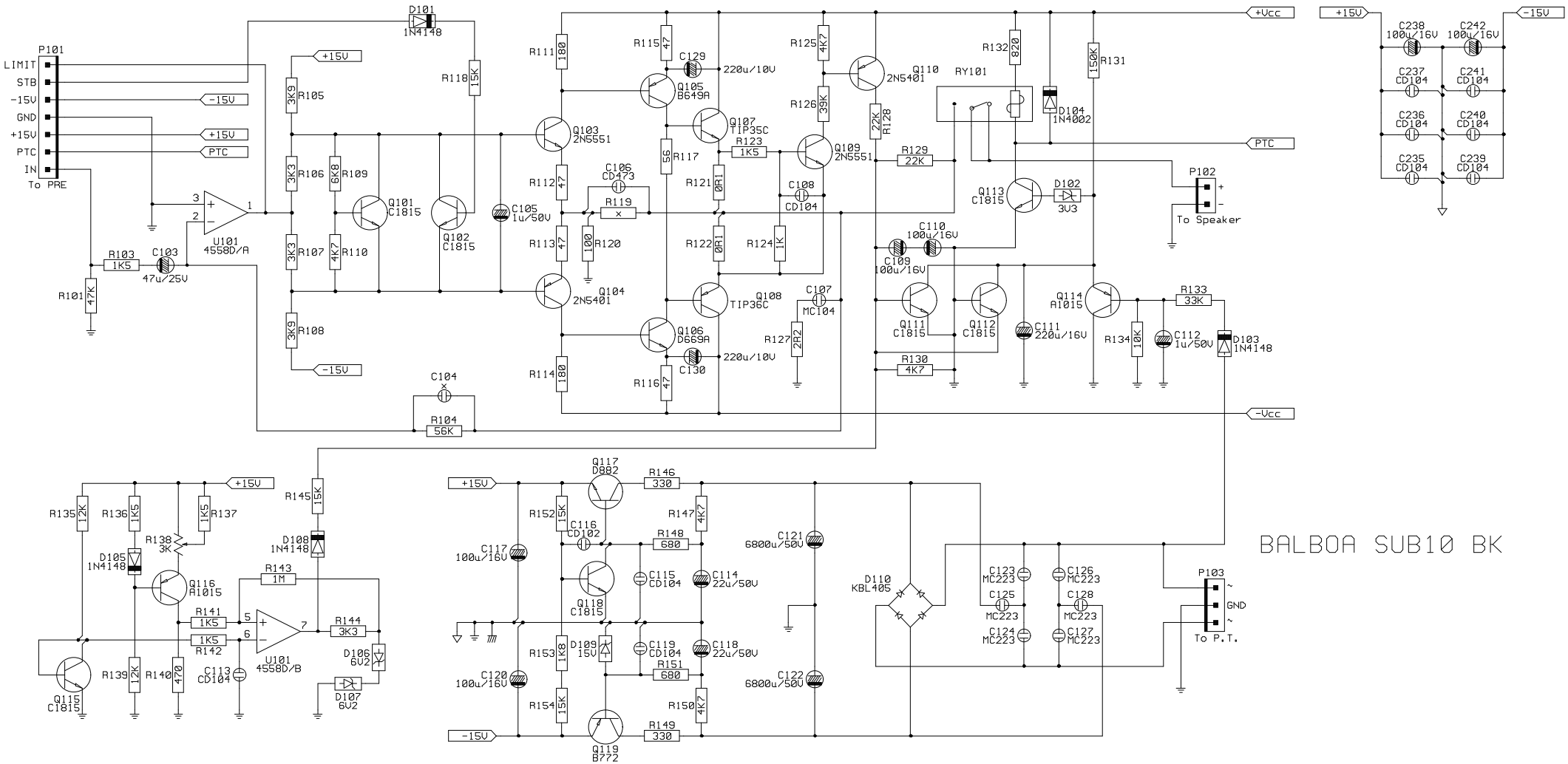
			CUSTOMER: JBL	
			DATE: 2006-09-20	



APPROVE BY	CHECK BY	DRAWING BY	NAME: POWER-AMP	3 / 3
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			CUSTOMER: JBL	
			DATE: 2006-09-20	